UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/554,298	11/18/2005	Klaus Rutz	29805.132.3	4353

22859 7590 07/02/2009

INTELLECTUAL PROPERTY GROUP
FREDRIKSON & BYRON, P.A.
200 SOUTH SIXTH STREET, SUITE 4000
MINNEAPOLIS, MN 55402

EXAMINER	
STIMPERT, PHILIP EARL	
ART UNIT	PAPER NUMBER
3746	
MAIL DATE	DELIVERY MODE
07/02/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/554,298	RUTZ ET AL.	
	Examiner	Art Unit	
	Philip Stimpert	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6,7 and 11-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6,7 and 11-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1 May 2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 7, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haberlander et al. (US 6,457,944) in view of Llewellyn (GB 2,130,305) and Takahashi et al. (US 5,664,937).

4. Regarding claim 13, Haberlander et al. teach a method for controlling a pump (1, see col. 5, ln. 65-67) including a pump element which may be a diaphragm (col. 2 ln. 27) that is actuated by a ram (2, see col. 5, ln. 50-55) which is powered by an electric motor (3), comprising reciprocating the pumping element by rotation of the cam. Haberlander teaches that the reciprocation takes place in a first direction for a compression, or pressure, stroke and section for an aspiration, or suction, stroke.

Haberlander et al. teach that the electric motor (3) is asynchronous, and that the operating speed thereof may be varied (such as during the suction cycle). Haberlander et al. do not teach varying the rotating speed of the cam during a compression stroke of the pump. Llewellyn teaches a cam-driven piston pump, and in particular teaches that the cam is driven to drive the pistons at constant speed (page 1, ln. 119) so as to produce a uniform flow rate (page 1, ln. 29-34). Llewellyn teaches accomplishing this by varying a profile of the cam while maintaining rotational speed thereof. However, those of ordinary skill in the art are aware of the mathematical disciplines of kinematics and calculus, and would thus be completely capable of deriving formulae for producing constant piston linear velocities given any cam profile. Further, Takahashi et al. teach a precision pump which includes altering the rotating speed of a motor to affect pump output pressure evenness (col. 2, ln. 26-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the pump control system of Haberlander et al. to vary the speed of rotation of the cam as taught by Takahashi et al. to produce constant velocity of the pumping element, as taught by Llewellyn. Thus modified, one of ordinary skill would appreciate that the rotational speed of the cam would decrease to a minimum halfway through the compression stroke, as the component of the cam's movement in the direction of the stroke would be maximum at that point in the stroke and the rotation speed would decrease to it's minimum to maintain the constant linear motion of the diaphragm. Further, Haberlander teaches that it is "possible to significantly shorten the suction cycle relative to the pressure cycle" and that this results in a reduced gap in dosing. Thus it would be

obvious to accelerate the rotating speed of the cam from a minimum to a maximum speed starting approximately halfway through the compression stroke so as to maintain the constant linear speed of the diaphragm, and to maintain the maximum rotating speed through the aspiration stroke to minimize the time duration of that stroke.

5. Regarding claim 7, Haberlander et al. teach the use of sensors (11) to control the cam rotation speed. In the present combination, it would be obvious to use the information provided by these sensors to better control the speed variation engendered by application of the teachings of Llewellyn.

6. Regarding claim 14, according to the combination, the cam is kept at a maximum rotating speed during the aspiration stroke and would thus tend to begin the compression stroke (which the examiner notes begins at the end of the aspiration stroke) at that maximum speed. Further, the component of the cam's movement in the direction of the diaphragm stroke would be minimum at the beginning and end of the compression stroke, thus in order to maintain a constant linear motion, the rotational speed would necessarily be maximum at the start of the compression stroke.

7. Claims 6, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haberlander et al. in view of Llewellyn and Takahashi et al as applied to claim 1 above, and further in view of Weigold (WO02/087057, as translated in US 2004/0027014).

8. Regarding claim 6, Haberlander et al. do not teach that the motor is an EC motor. Weigold et al. teach an EC motor (see Fig. 1) that is used to drive a coolant pump. As Haberlander et al. do not disclose the details of their pump, it would have been obvious

to one of ordinary skill in the art to use an EC motor such as that taught by Weigold in order to provide the necessary motor for implementing the system of Haberlander et al.

9. Regarding claim 11, Haberlander et al. teach the provision of rotor position sensors (11), which would be obvious to make integral with the motor.

10. Regarding claim 12, in performing a combination of Haberlander et al. with the teachings of LLewellyn and Takahashi et al, it would be obvious to use the information from the sensors (11) to provide improved control of the cam rotation to provide the rotational acceleration indicated by the combination of Haberlander, Llewelyn and Takahashi et al.

Response to Arguments

11. Applicant's arguments with respect to claim 13 have been considered but are moot in view of the new ground(s) of rejection.

12. To ensure the clarity of the position taken above, the examiner will briefly discuss the implications of the linear motion indicated by Llewellyn. Consider a unit radius circle centered on the origin of a Cartesian plane. If an element (roughly analogous to the cam) is constrained to rotate along that circle, then its velocity will be tangential to the circle, and may be considered to have vertical and horizontal components as defined by the coordinate system. As the element rotates rotates through the point directly above the origin (and analogous in the combination to the start of the compression stroke), the velocity vector will be entirely horizontal, having no vertical component at all. Thus, if a second element is constrained to reciprocate along the vertical axis somewhere below the circle, and to be motivated in that reciprocation by the first element traveling along

the circle, its vertical, reciprocal motion will stop when the first element reaches the top, as there is no vertical component to drive the second element. This elicits the requirement that the cam be rotating at its maximum speed at the beginning and end of the compression stroke, in order to compensate for the asymptotic lack of movement of the cam in the direction of reciprocation. Similarly, since the velocity of the rotating element is entirely vertical as it crosses the horizontal axis, the velocity transmitted to the second element will be at its largest relative to the velocity of the rotating element. Thus, midway through the compression stroke, the cam will slow to its minimum speed in order to maintain the constant velocity of the piston, and as before, accelerate until the end of the cycle as the vertical component of the cam's motion decreases. It is these geometrical considerations which the examiner submits are apparent to those of ordinary skill in the art, and which thereby render the invention obvious as claimed.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Slate et al. (US 4,919,596) teaches a fluid delivery control and monitoring system which teaches maximizing rotation rate during an aspiration stroke (col. 3, ln. 45-50, col. 6, ln. 14-36).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art Unit 3746

/P. S./
Examiner, Art Unit 3746
30 Jun 2009